

# HS

## Heater Skids

Designed to achieve target ISO Codes and safely heat hydraulic and lube oils, the HS is a fully self-contained heating and filtration solution ideal for service applications, mass fluid transfers, and preheating systems before they come online.

Completely customizable for hydraulic fluids and high viscosity lubrication oils up to ISO VG 680.



[hyprofiltration.com/HS](http://hyprofiltration.com/HS)



## More than your standard heater skid.

Whether you're performing a high velocity flush or preheating your system before it comes online, knowing your fluids are clean is the first step in extending your system and components' lifespans. HS heater skids come standard with properly positioned sample ports both up and downstream of the filter so you get consistently accurate readings and the knowledge that your system is operating as efficiently as possible.



## Rock solid from the ground up.

Standard carbon steel spill retention pans with fork guides provide a sturdy base to contain everything you need together in a single package. Add the 6" caster option for increased mobility or even select options for CE or CUL markings to meet required safety standards.

## You can't beat the heat.

With no direct contact with the heating element, your fluid will safely and quickly get up to temperature without the risk of burning. The programmable temperature control and integral no-flow switch prevent oil damage and allow you to heat your fluids at your own pace. And what's more: all this comes standard on every HS.



## Take control of your systems.

Smart relay enabled controls make the HS series heater skids easy to operate with just the push of a button. Take it one step further and select the optional PLC touch screen and make accessing real time data as easy as using that smartphone of yours.

## Filtration starts with the filter.

Within the housing on every HS is a powerful tool to help you get the most of your system and protect your critical components from particulate erosion. Media options down to  $\beta_{2.5_{\mu m}} = 1000$  on the oversized filter element deliver lower ISO Codes over longer periods of time, letting you clean your new or in use oil to ensure long gear and bearing life.



## Fits like a glove.

Designed and built specifically to meet your system's needs, HS heater skids can be completely customized so you get the powerful heating and filtration you need for that mass fluid transfer along with all the options you want to make the job easier than ever.

# Filter Sizing Guidelines

## Filter Sizing Guidelines and Viscosity Conversion

Effective filter sizing requires consideration of flow rate, viscosity (operating and cold start), fluid type and degree of filtration. When properly sized, bypass during cold start can be avoided/minimized and optimum element efficiency and life achieved. The filter assembly differential pressure values provided for sizing differ for each media code, and assume 32 cSt (150 SUS) viscosity and 0.86 fluid specific gravity. Use the following steps to calculate clean element assembly pressure drop.

Calculate  $\Delta P$  coefficient for actual viscosity

### Using Saybolt Universal Seconds (SUS)

$$\Delta P \text{ Coefficient} = \frac{\text{Actual Operating Viscosity}^1 \text{ (SUS)}}{150} \times \frac{\text{Actual Specific Gravity}}{0.86}$$

### Using Centistokes (cSt)

$$\Delta P \text{ Coefficient} = \frac{\text{Actual Operating Viscosity}^1 \text{ (cSt)}}{32} \times \frac{\text{Actual Specific Gravity}}{0.86}$$

Calculate actual clean filter assembly  $\Delta P$  at both operating and cold start viscosity

$$\text{Actual Assembly Clean } \Delta P = \text{Flow Rate} \times \frac{\Delta P \text{ Coefficient (from calculation above)}}{\text{Assembly } \Delta P \text{ Factor (from sizing table)}}$$

Sizing recommendations to optimize performance and permit future flexibility

- To avoid or minimize bypass during cold start the actual assembly clean  $\Delta P$  calculation should be repeated for start-up conditions if cold starts are frequent.
- Actual assembly clean  $\Delta P$  should not exceed 10% of bypass  $\Delta P$  gauge/indicator set point at normal operating viscosity.
- If suitable assembly size is approaching the upper limit of the recommended flow rate at the desired degree of filtration consider increasing the assembly to the next larger size if a finer degree of filtration might be preferred in the future. This practice allows the future flexibility to enhance fluid cleanliness without compromising clean  $\Delta P$  or filter element life.
- Once a suitable filter assembly size is determined consider increasing the assembly to the next larger size to optimize filter element life and avoid bypass during cold start.
- When using water glycol or other specified synthetics we recommend increasing the filter assembly by 1~2 sizes.



# HS Filter Sizing Guidelines

$\Delta P$ Factors <sup>1</sup>	Length	Units	Media	05M	1M	3M	6M	10M	16M	25M	**W
			VTM								
16/18		psid/gpm	0.0628	0.0473	0.0463	0.0391	0.0303	0.0271	0.0266	0.0256	0.0046
		bard/lpm	0.0011	0.0009	0.0008	0.0007	0.0006	0.0005	0.0005	0.0005	0.0001
36/39		psid/gpm	0.0440	0.0331	0.0324	0.0273	0.0212	0.0190	0.0186	0.0179	0.0032
		bard/lpm	0.0008	0.0006	0.0006	0.0005	0.0004	0.0003	0.0003	0.0003	0.0001

  

Length	Units	Media	3A	6A	10A	16A	25A
		1A					
16/18	psid/gpm	0.0514	0.0434	0.0336	0.0302	0.0295	0.0284
	bard/lpm	0.0009	0.0008	0.0006	0.0005	0.0005	0.0005
36/39	psid/gpm	0.0360	0.0304	0.0235	0.0211	0.0207	0.0199
	bard/lpm	0.0007	0.0006	0.0004	0.0004	0.0004	0.0004

<sup>1</sup>Max flow rates and  $\Delta P$  factors assume  $\mu = 150$  SUS, 32 cSt. See filter assembly sizing guideline for viscosity conversion formula for viscosity change.

# HS Specifications

**Dimensions** Consult factory with model number for dimensions and connection sizes.

**Operating Temperature** **Fluid Temperature** 30°F to 225°F (0°C to 105°C) **Ambient Temperature** -4°F to 104°F (-20C to 40C)

**Materials of Construction** **Housing** Carbon steel with industrial coating **Tray** Carbon steel with industrial coating **Plumbing** Carbon steel with industrial coating **Heater** Aluminum low watt density fin tube

**Electric Motor** TEFC with overload protection

**Pump** Cast iron, positive displacement gear pump with internal relief. Maximum pressure on pump inlet 15 psi (1 bar).

**Pump Relief Setting** 85 psi (5.86 bar)

**Media Description** **M** G8 Dualglass, our latest generation of DFE rated, high performance glass media for all hydraulic & lubrication fluids.  $\beta_{x_{(c)}}$  = 1000 ( $\beta_x$  = 200) **A** G8 Dualglass high performance media combined with water removal scrim.  $\beta_{x_{(c)}}$  = 1000 ( $\beta_x$  = 200) **W** Stainless steel wire mesh media  $\beta_{x_{(c)}}$  = 2 ( $\beta_x$  = 2)

**Replacement Elements** **To determine replacement elements, use corresponding codes from your equipment part number:**  
**Element Type Code** **Filter Element Part Number** **Example**  
LF7 HP107L[Length Code] - [Media Selection Code][Seal Code] HP107L36-25MV  
LF8 HP8314L[Length Code] - [Media Selection Code][Seal Code] HP8314L16-12MB

**Fluid Compatibility** Petroleum and mineral based fluids (standard). For specified synthetics contact factory for compatibility with fluorocarbon seal option. For phosphate ester (P9) or skydrol fluid (S9) compatibility select fluid compatibility from special options.



# HS Part Number Builder



Flow Rate <sup>1</sup>					
<b>3</b>	3 gpm (11.4 lpm)			<b>20</b>	20 gpm (75.7 lpm)
<b>5</b>	5 gpm (18.9 lpm)			<b>30</b>	30 gpm (114 lpm)
<b>10</b>	10 gpm (37.9 lpm)			<b>45</b>	45 gpm (170 lpm)
<b>15</b>	15 gpm (56.8 lpm)			<b>60</b>	60 gpm (225 lpm)

Power Options	60 Hz		50 Hz	
<b>E3</b>	230 V ac, 1P <sup>2</sup>		<b>E2</b>	220 V ac, 1P <sup>2</sup>
<b>23</b>	230 V ac, 3P		<b>22</b>	220 V ac, 3P
<b>46</b>	460-480 V ac, 3P		<b>38</b>	380 V ac, 3P
<b>57</b>	575 V ac, 3P		<b>41</b>	415 V ac, 3P

Element Type		
<b>LF7</b>	LF housing with HP107L36 filter coreless element with integral element 50 psid (3.4 bard) bypass	
<b>LF8</b>	LF housing with HP8314L39 filter coreless element with integral post 50 psid (3.4 bard) bypass	
<b>X</b>	No filter housing	

Seals	
<b>B</b>	Nitrile (Buna)
<b>V</b>	Fluorocarbon
<b>E-WS</b>	EPR seals + stainless steel support mesh

Media Selection	G8 Dualglass		Stainless wire mesh
<b>1M</b>	$\beta_{2.5} = 1000, \beta_1 = 200$		<b>25W</b> 25 $\mu$ nominal
<b>3M</b>	$\beta_5 = 1000, \beta_3 = 200$		<b>40W</b> 40 $\mu$ nominal
<b>6M</b>	$\beta_7 = 1000, \beta_6 = 200$		<b>74W</b> 74 $\mu$ nominal
<b>10M<sup>3</sup></b>	$\beta_{12} = 1000, \beta_{12} = 200$		<b>149W</b> 149 $\mu$ nominal
<b>16M</b>	$\beta_{17} = 1000, \beta_{17} = 200$		
<b>25M</b>	$\beta_{22} = 1000, \beta_{25} = 200$		

Heat Capacity			
<b>4</b>	1 x 4.5 kw heater	<b>36</b>	3 x 12 kw heaters
<b>9</b>	1 x 9 kw heater	<b>48</b>	4 x 12 kw heaters
<b>12</b>	1 x 12 kw heater	<b>64</b>	4 x 16 kw heaters
<b>24</b>	2 x 12 kw heaters		

Special Options		
<b>6</b>	6" (15 cm) casters	<b>P9<sup>4</sup></b> Phosphate ester fluid compatibility modification
<b>B</b>	Basket strainer	<b>S</b> 304 stainless steel filter vessels
<b>C</b>	CE marked for machinery safety directive 2006/42/EC	<b>S9<sup>5</sup></b> Skydrol fluid compatibility modification
<b>D</b>	High filter element $\Delta P$ indicator light	<b>T</b> Hose kit (suction/return hoses & wands)
<b>J</b>	Individual heater selector switch	<b>U</b> 50' (13 m) electrical cord (no plug)
<b>M</b>	Discharge line visual flow meter	<b>V</b> Inlet control valve N/C solenoid
<b>O</b>	On-board PM-1 particle monitor	<b>Y</b> VFD variable speed motor frequency control

<sup>1</sup>Nominal flow rates at 60 Hz motor speeds.

<sup>2</sup>Option only available when coupled with 4 kw heater option and 3 or 5 gpm max flow rate unit.

<sup>3</sup>For elements HP8314, use 12M for media code in place of 10M.

<sup>4</sup>When selected, must be paired with Seal option "V." Contact factory for more information or assistance in fluid compatibility.

<sup>5</sup>When selected, must be paired with Seal option "E-WS." Contact factory for more information or assistance in fluid compatibility.